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(71) Applicant(s)

Ivan Dias
18 Theobalds Way, Frimley, CAMBERLEY, Surrey,
GU18 5RF, United Kingdom

(72) Inventor(s)

Ivan Dias

(74) Agent and/or Address for Service

Ivan Dias
18 Theobalds Way, Frimley, CAMBERLEY, Surrey,
GU18 5RF, United Kingdom

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(56) Documents Cited

GB 2233579 A WO 91/05672 A1 US 4875696 A

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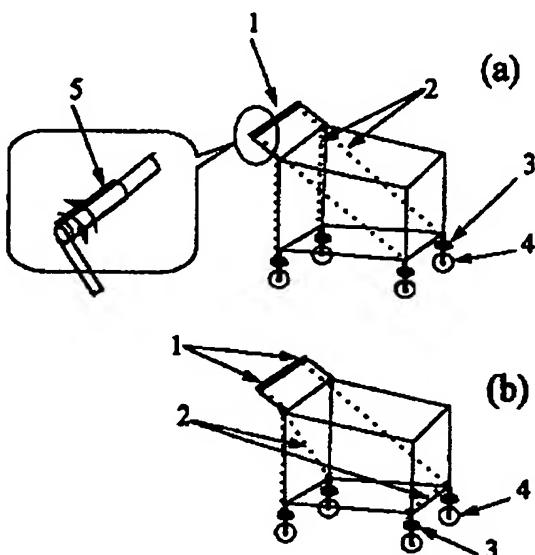
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(54) Abstract Title

Trolley with locking wheels

(57) A trolley is provided with a number of wheels 4 each movable about a vertical axis, this movement being lockable by means of two inter-engaging sliding discs 3 operated by a hand control 5. The trolley may be a shopping trolley and the hand control may be mounted on the push handle 1. Alternatively the control may be remote. The locking movement may be produced manually, eg via cables 2, or electrically. The locking mechanism may be spring biased away from a locking position. The hand control may be locked in the position corresponding to the locked position of the wheels.

Fig 4

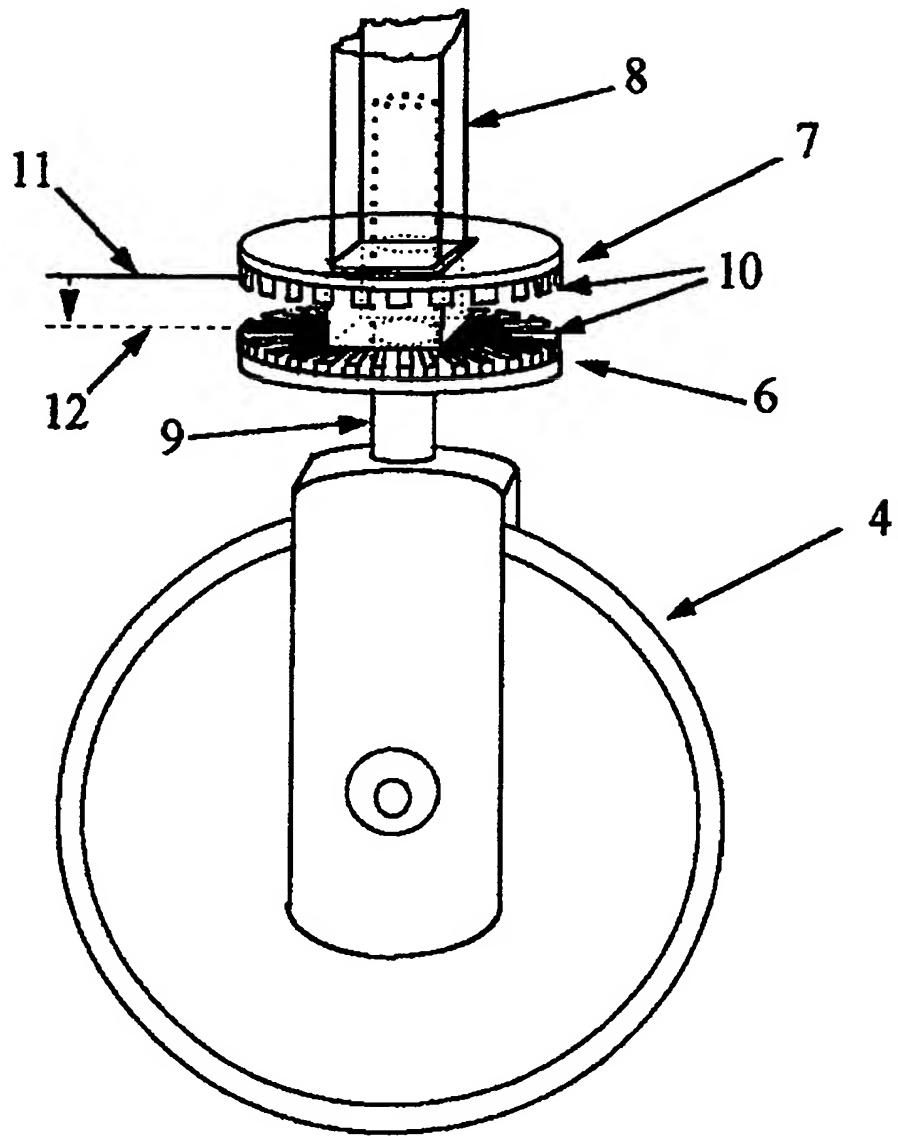


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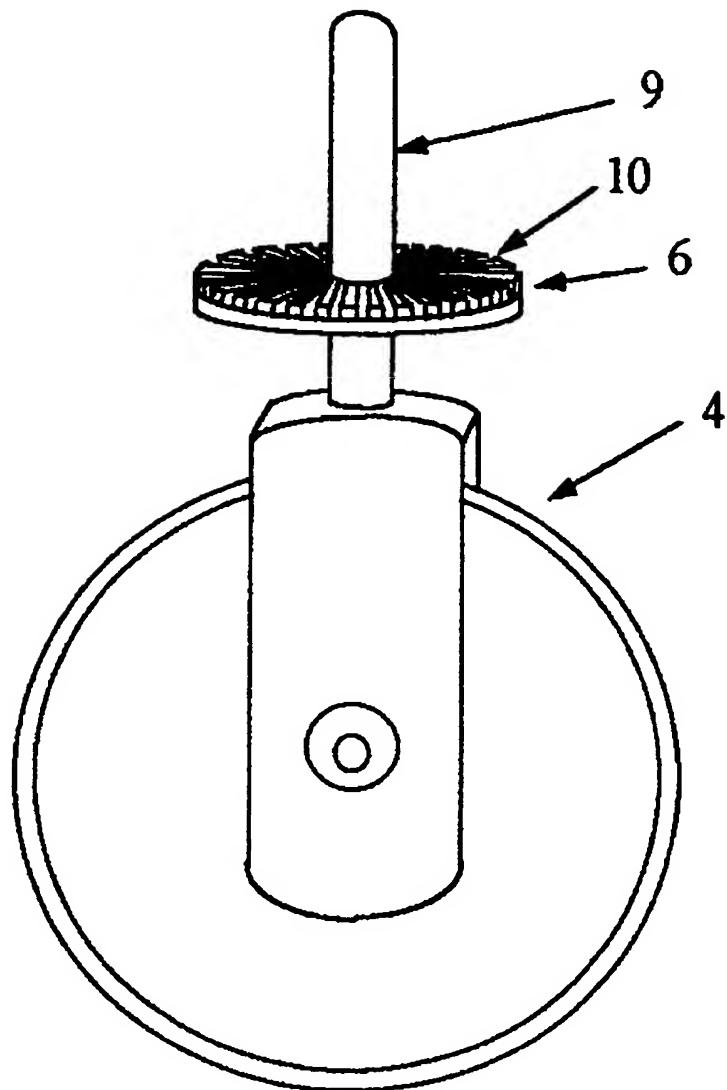
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Fig 1



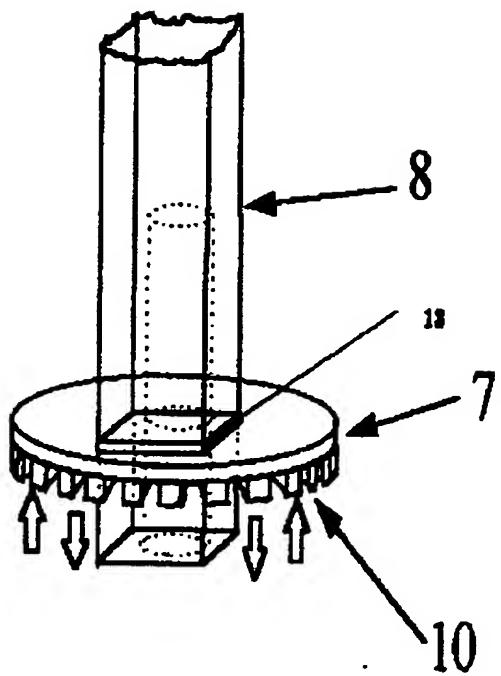
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Fig 2



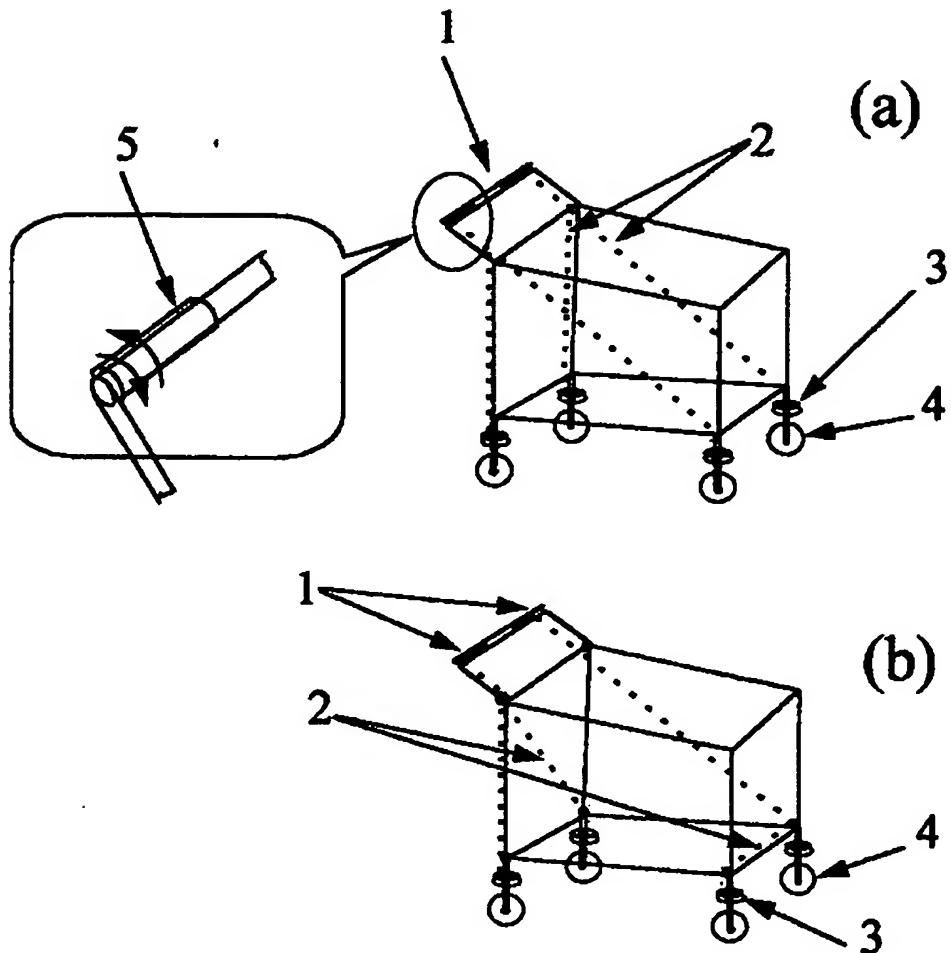
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Fig 3



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Fig 4



DIRECTION CONTROLLABLE PUSH TROLLEY

This invention relates to a direction controllable push trolley

Push trolleys are being widely used in supermarkets, DIY stores, garden centres, airports etc. These trolleys are easily manoeuvrable as they have wheels which are free to rotate in any direction (direction free wheels). While all four wheels of a trolley fitted with direction free wheels as in a supermarket trolley is good for manoeuvrability, it has made the trolley more susceptible to stray on slopes that are non parallel to the path of the trolley. Lack of provision to fix the direction of the trolley to prevent stray and hold its course is an inconvenience to the user. The user needs to exercise an additional effort to counteract the pull towards the slope whilst steering the trolley forward. The magnitude of the pulling force is dependent on the weight of the trolley and the steepness of the slope. Handling will become progressively difficult as the load gets heavier or the slope gets steeper.

Occasionally trolleys are found with two fixed wheels (direction permanently fixed either on front or back) and two direction free wheels. Direction fixed wheels gives more control but restrict its manoeuvrability.

According to the present invention there is provided an direction controllable push trolley comprising a common trolley, a direction locking mechanism on each wheel in the form of an interlocking pair of discs one being fixed to the wheel and the other being adapted to slide up and down along a non cylindrical rod which bridges the body of the trolley to the wheel, two hand controls on the push bar of the trolley to operate the mechanism.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing in which:-

Figure 1 illustrates, a push trolley wheel with a direction locking mechanism;

Figure 2 shows the lower disc of the direction locking mechanism attached to the wheel;

Figure 3 shows the upper disc of the direction locking mechanism placed on a square rod;

Figure 4 illustrates a suggested hand controls for the operation of the wheel direction locking mechanism and two control strategies;

Referring to the drawing the direction locking mechanism comprises a lower disc 6 with toothed upper side 10 fixed to the wheel 4 and a vertically movable upper disc 7 with toothed underside 10 in the form of an interlocking device secured to the wheel. The teeth could be tapered on top (not shown here) for more efficient interlocking. These discs could also take other shapes and forms than illustrated here e.g. pins and holes rather than teeth. If the teeth are replaced with a single ridge on one disc and a fitting groove on the other disc, the direction of the wheel can be fixed just to one direction (forward). Lower disc 6 rotates on a horizontal plane synchronously with the wheel when the trolley changes its direction. Upper disc 7 is not fixed and it can be slid vertically along a non cylindrical rod 8 running through a non cylindrical centre hole 13 on the disc, but it cannot rotate on a horizontal plane. The non cylindrical rod connects the wheel to the trolley. By hand controls 5 the upper disc 7 can be moved into the locking position 12 and interlock with the lower disc 6, hence immobilising the horizontal rotation of the lower disc, and locking the direction of the wheel 4 at its present position. Therefore, locking on the direction of the wheel and hence the direction of the trolley is carried out entirely by moving of the upper disc. The operation of the mechanism by hand controls may either be brought about by mechanically e.g. via cables or by electrically. If the movement of the upper disc is brought about electronically, the mechanism could also be triggered on and off by remote controls. Now the wheel locking mechanism can be used as an anti theft device in addition to direction controllability. For example, automatically triggering on the wheel direction locking mechanism on all wheels when the trolley leaves the boundaries of its premises. The mechanism should always return to its disengaged position on relaxation of the mechanism such as by a sprung loaded upper disc. By a catchment at the hand controls the mechanism could also be left on at the engaged position.

Direction control is achieved by simultaneous engagement of the direction locking mechanism on a pair of wheels by locking them onto the same direction as shown in Fig 4(b) on the front pair or on the rear pair or as shown in Fig 4(a) on the left pair or on the right pair of wheels. By two hand controls 5 on either side of the push bar 1 of the trolley, all four wheels can be operated for direction control Fig 4. For example as shown in Fig 4(b) left hand control to simultaneously lock the direction of the rear pair of wheels and similarly right hand control to lock direction of the front pair of wheels.

The trolley will operate normally when the wheel direction locking mechanism is not being applied. Therefore, it is provided only as an option to the user.

Claims

1. A direction controllable push trolley comprising a common trolley, a direction locking wheel mechanism on each wheel in the form of a interlocking pair of discs one being fixed to the wheel and the other being adapted to slide up and down along a non cylindrical rod which bridges the body of the trolley to the wheel, two hand controls on the push bar of the trolley to operate the direction control mechanism.
2. A direction controllable push trolley as claimed in Claim 1 wherein controls means provided on the wheel direction locking mechanism to engage and disengage by mechanically, electrically or electronically and in house or by remote to fix the direction of the wheels.
3. A direction controllable push trolley as claimed in Claim 1 and Claim 2 wherein remote means provided on the wheel locking mechanism to be activated and deactivated electronically with sensors via a transmitter from outside the trolley.
4. A direction controllable push trolley as claimed in any preceding claim, wherein hand controls means is adapted on the push bar of the trolley to engage an disengage the wheel direction locking mechanism via cables.
5. A direction controllable push trolley as claimed in any preceding claim, wherein sprung loaded controls means is provided the direction locking mechanism to sprung back to the disengaged position when the mechanism is not being applied or released.
6. A direction controllable push trolley as claimed in any preceding claim, wherein catchment means is provided the hand control to be locked on at the engaged position of the wheel locking mechanism.
7. A direction controllable push trolley fitted with direction locking mechanisms on wheels substantially as described herein with reference to Figures 1-4 of the accompanying drawing.

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Claims

1. A 'direction controllable' push trolley comprising a common trolley, a 'wheel direction locking mechanism' ('invented mechanism') on each wheel in the form of a pair of discs with interlocking teeth, one disc being fixed to the wheel which turns co-axially with the wheel when the trolley changes its direction and the other disc being adapted to slide vertically along a non cylindrical rod which bridges the frame of the trolley to the wheel, two hand controls on or near the push bar of the trolley for the user to control the direction of the trolley by controlling the 'invented mechanism', by adopting one of the following hand control operational strategies via two hand controls, either by controlling a front wheel by one hand control and the other front wheel by the other hand control or by controlling the pair of front wheels by one hand control and the pair of rear wheels by the other hand control, or by controlling the pair of left wheels by one hand control and the pair of right wheels by the other hand control. Each operational strategy offers a different level of controllability and manoeuvrability.
2. A 'direction controllable' push trolley as claimed in Claim 1 wherein controls means is provided on the 'invented mechanism' to be operated by mechanically, electrically or electronically (either locally or remote) to control the direction and the manoeuvrability of the trolley.
3. A 'direction controllable' push trolley as claimed in Claim 1 and Claim 2 wherein remote means provided on the 'invented mechanism' to be operated electronically by a receiver on the trolley and a transmitter at outside the trolley.
4. A 'direction controllable' push trolley as claimed in Claim 1, Claim 2 and Claim 3 wherein electrically means provided on the 'invented mechanism' to be operated by electromagnets to control the movement of the upper disc using electricity.
5. A 'direction controllable' push trolley as claimed in any preceding claim, wherein hand controls means is provided on or near the push bar of the trolley two mechanical units at either side to operate the 'invented mechanism' via cables.
6. The 'invented mechanism' as claimed in any preceding claim, wherein sprung loaded controls means is provided on the 'invented mechanism' to sprung back to its disengaged position when the mechanism is not being applied or released.

7. A 'direction controllable' push trolley as claimed in any preceding claim, wherein catchment means is provided on the hand control to be left 'locked-on' at the engaged position of the 'invented mechanism'.
8. A 'direction controllable' push trolley as claimed in any preceding claim, wherein control strategy means is adopted to a wheel or a pair of wheels to be controlled by which hand control unit.
9. A 'direction controllable' push trolley fitted with the 'wheel direction locking mechanism' on wheels substantially as described herein with reference to Figures 1-4 of the accompanying drawing.



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Application No: GB 9716602.9
Claims searched: 1 to 6

Examiner: Karl Whitfield
Date of search: 4 November 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): A4L (LAKC, LDF), B7B (BTX2), B7D (DHL)

Int Cl (Ed.6): B60B 33/00, 33/02, B62B 3/14, 5/00, 5/04

Other: Online database: Derwent World Patents Index accessed via Questel

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2293579 A (CLARES) especially figures 2 & 3	
A	WO 91/05672 A1 (LOVIE) especially figure 1	
A	US 4875696 (WELCH et al.) especially figures 14-18	

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